Pixel Geometry in Geant4

Davide Costanzo

LBNL

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- The Geometry Definition

- Material Distributions: Geant4 vs. Atlsim

- The Pixel GeoModel

The Geometry Definition

Pixel Barrel and End-Cap Described in Geant4:

- Use Atlsim (pixbgeo.age, pixegeo.age) as a Guideline

- Primary Numbers from Nova DB

- Use G4Svc and Run in Athena
  - SingleParticleGun to Generate Geantinos
  - Physics List: Geantino (defined by G4Svc)

- Athena Algorithm to obtain Material Distributions, R.L. vs. η (exploits G4VSteppingAction)
  - Material can be Excluded by jobOptions
  - Use the Athena Histogram Service

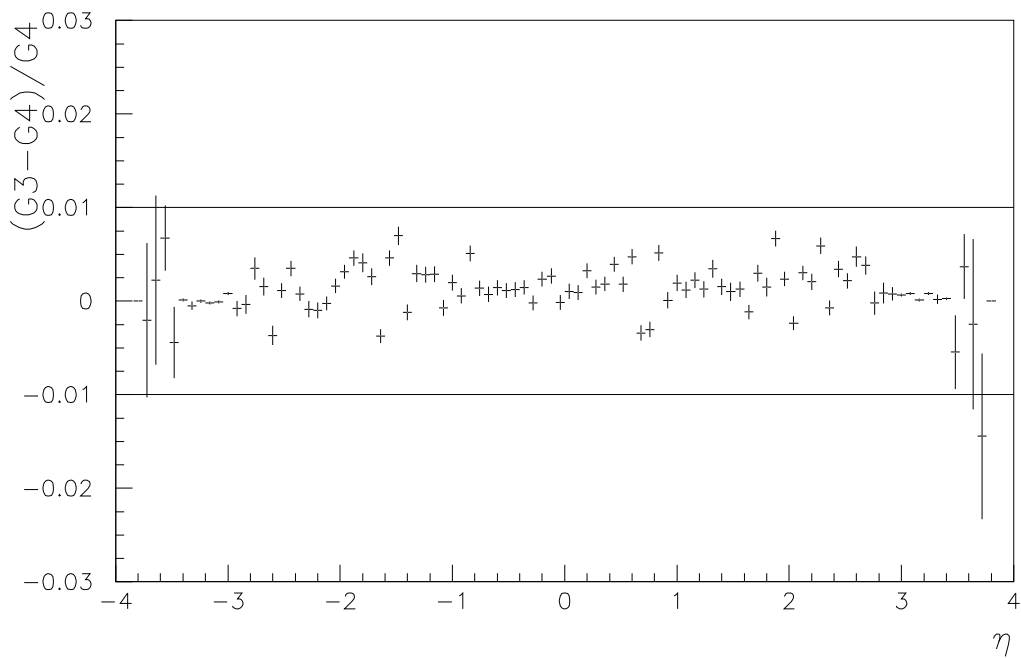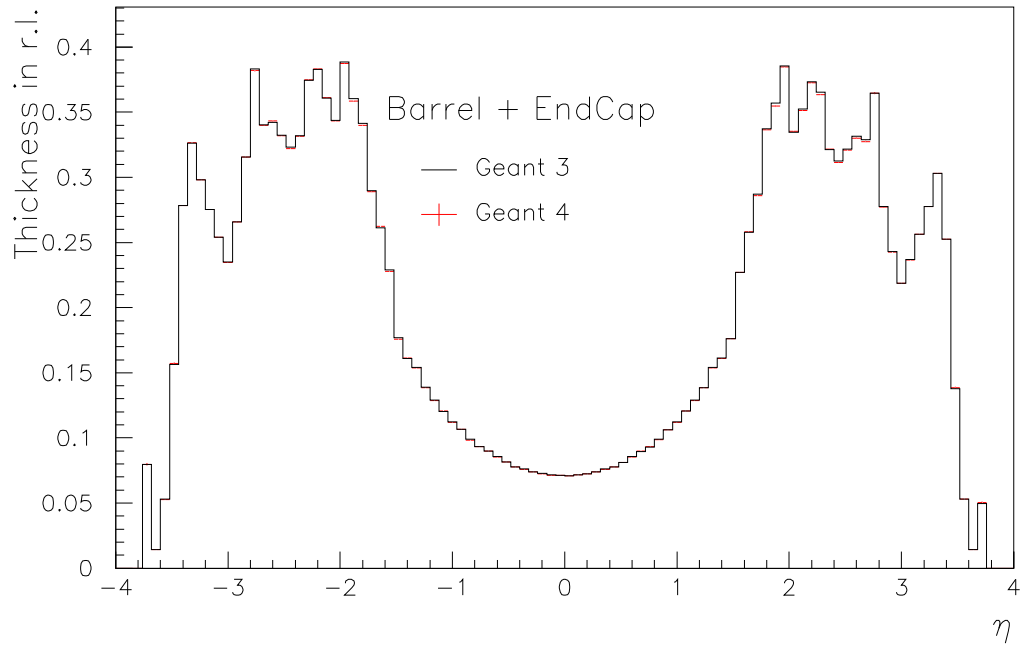# A Snapshot

Green: Cables Container
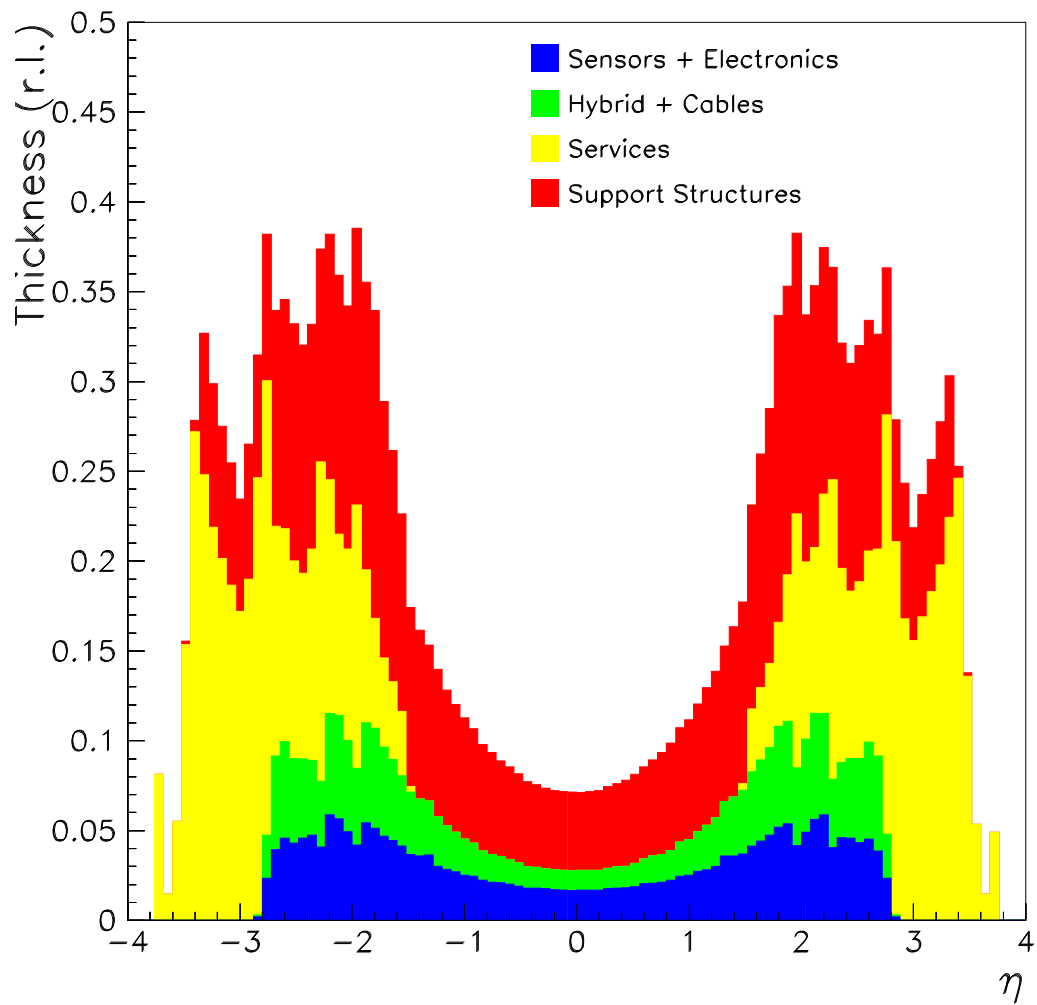
Red: Ladder Container

See
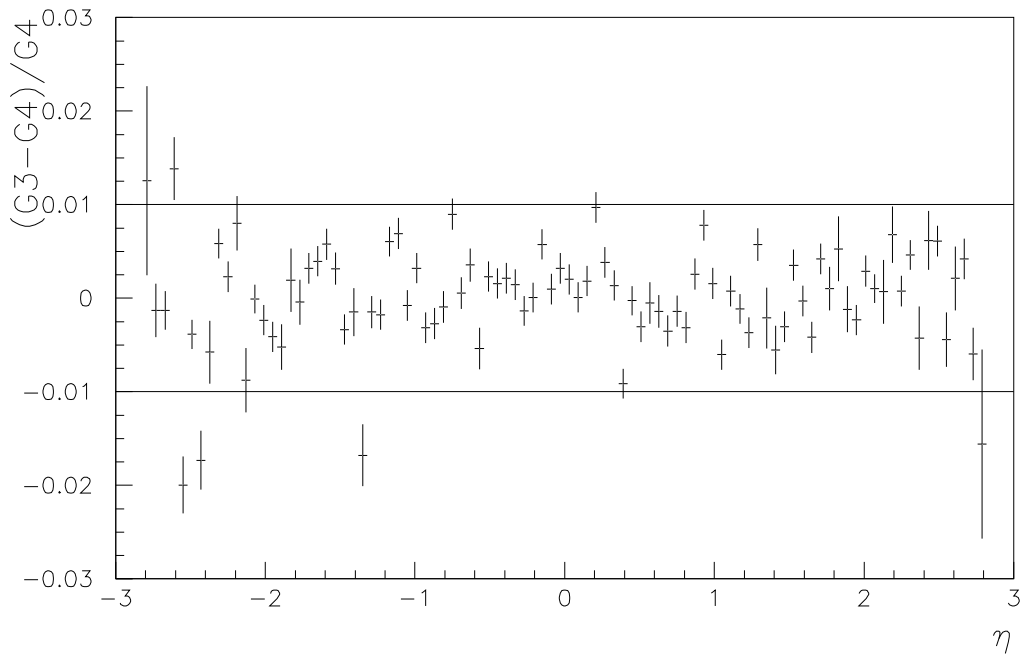
`http://www-atlas.lbl.gov/~dcostanz/geant4.html`
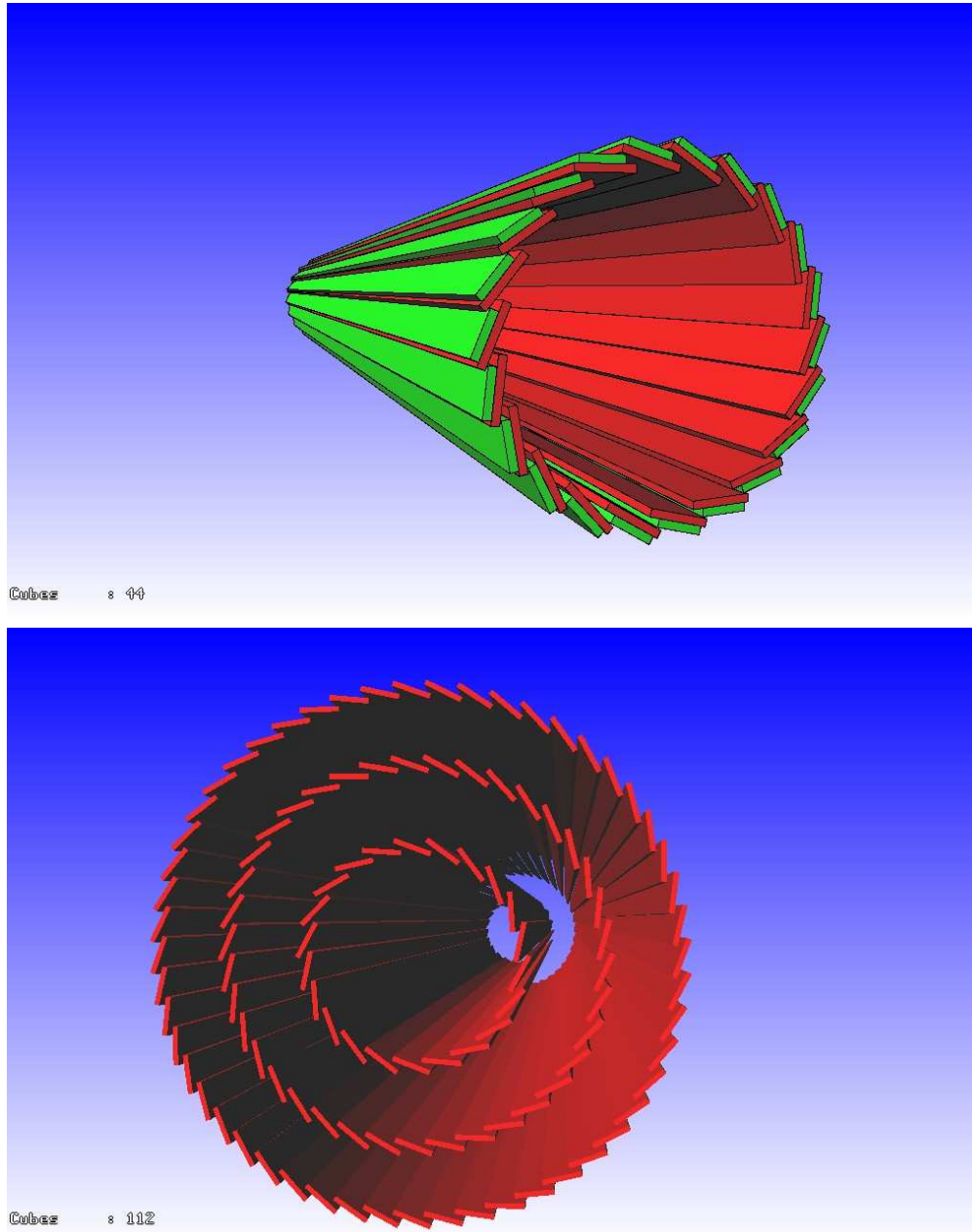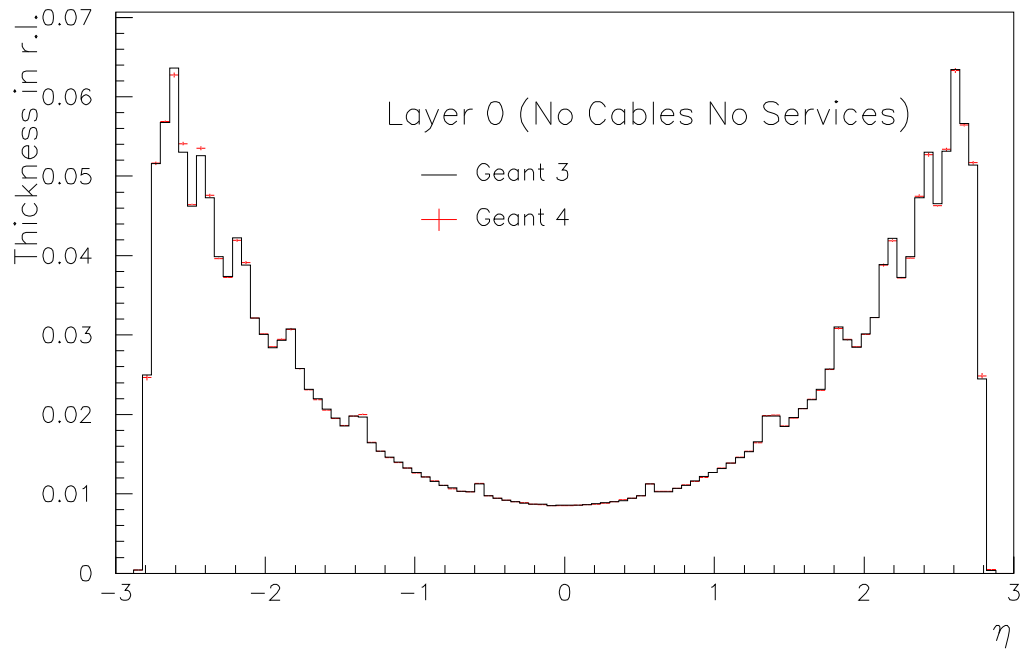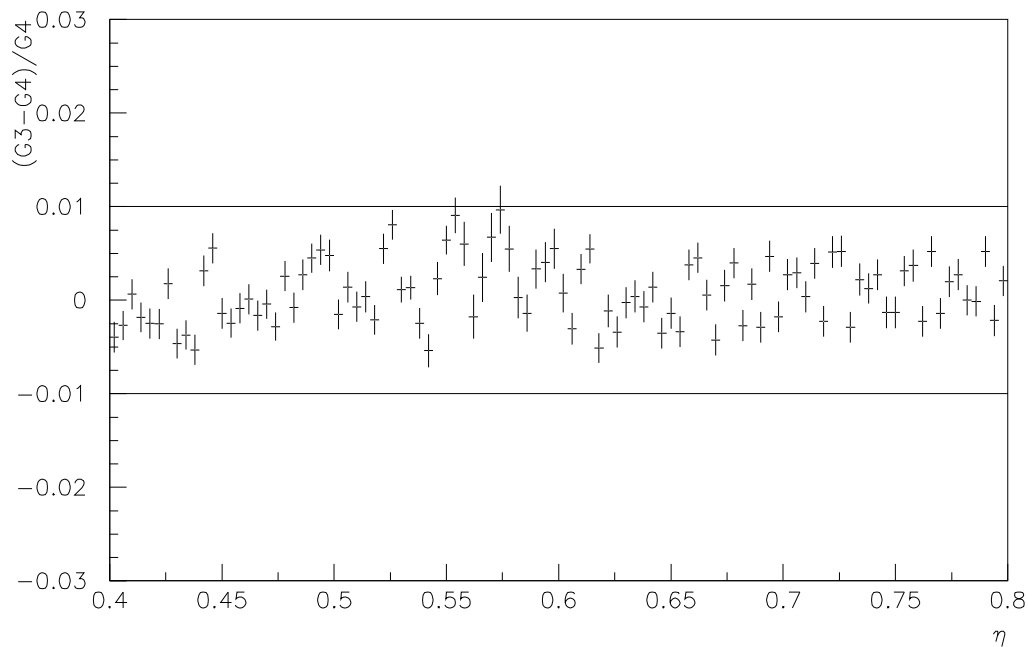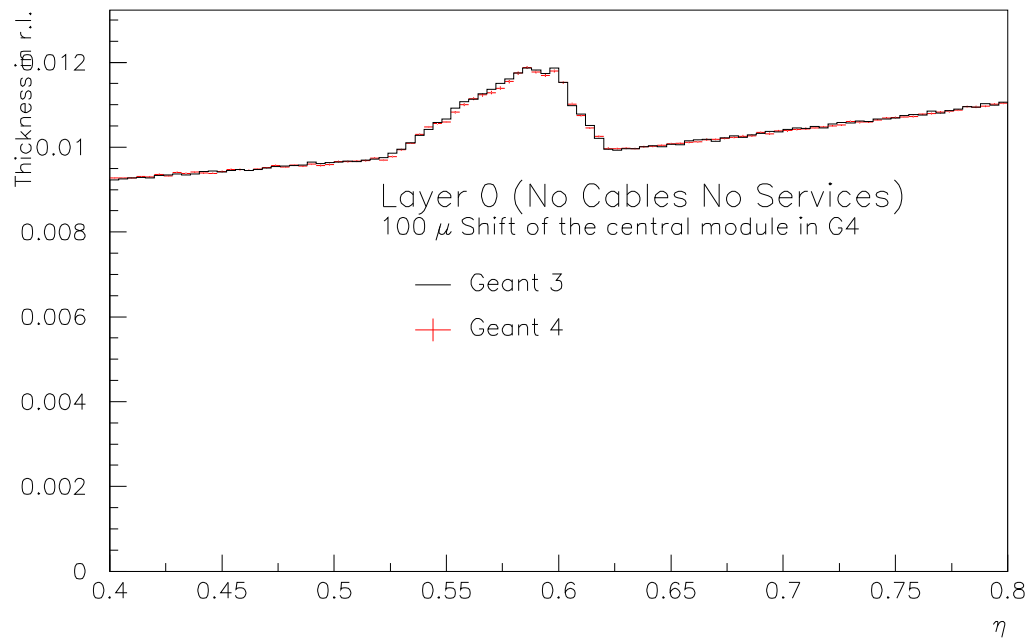
Total Material. G4 vs. G3

Material in G4

B-Layer
(No Cables-No Services)

B-Layer
Overlap b/w Central and 1st Module

Thickness in r.l.

Layer 0 (No Cables No Services)
100 μ Shift of the central module in G4

— Geant 3
+ Geant 4

η

$(G3-G4)/G4$

η

Overlap b/w Central and 1st Module.

The Central Module is Shifted by 100 μm in G4.

The Effect on the Material Distribution is Visible.
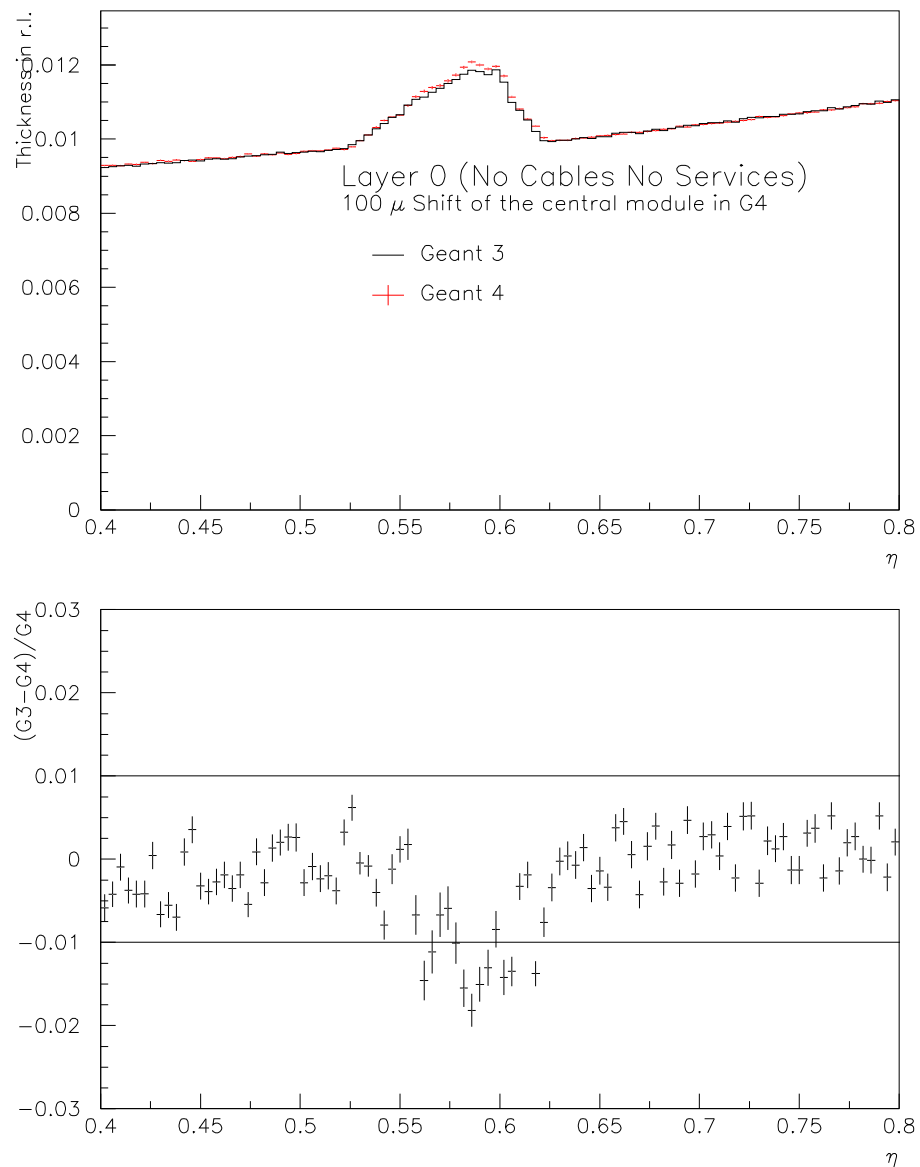
The Pixel GeoModel
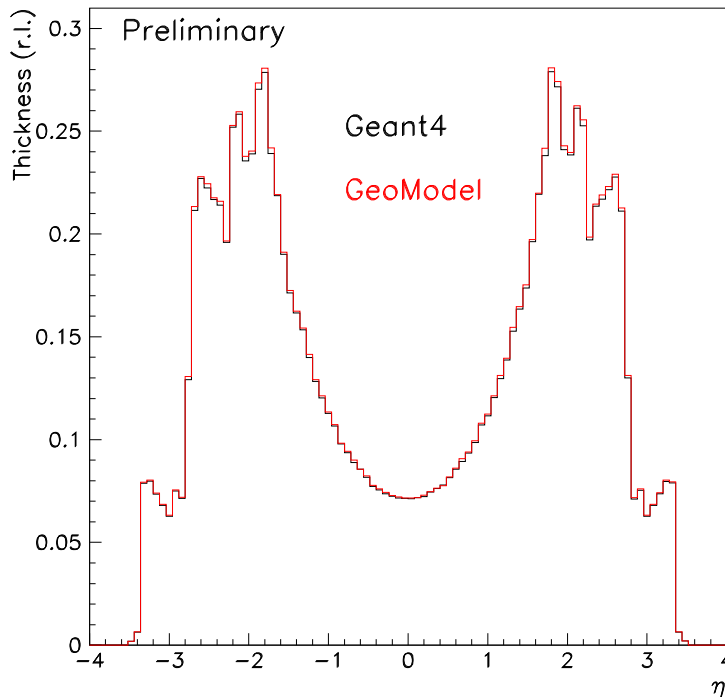
- Same Geometry Description also in GeoModel. Now in CVS:

  InnerDetector/InDetDetDescr/PixelGeoModel

- Different Approach:

  – Geant4: Physical Volumes can be Places Inside Logical Volumes

  – GeoModel: Physical Volumes Must be Places Inside Physical Volumes.

Geant4 Geometry Filled Starting from GeoModel

Conclusions

- Pixel Geometry has been Described in Geant4 and GeoModel

- The Thickness vs. η is in Agreement with Geant3

- Future Plans:
  - Integrate in the (future) ATLAS Geant4 Simulation
  - Add Sensitive Detectors